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THE CHARACTERISTICS OF THE ZONES. II.—THE TEMPERATE ZONES*

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Synopsis

General: "Temperate" zones.—Temperature—Pressure and Winds—Rainfall—Humidity and Cloudiness—Seasons: their effects on man—Weather—Climatic subdivisions—South temperate zone—Sub-tropical belts: Mediterranean climates—North temperate zone: Western coasts—Interiors—Eastern coasts—Mountain climates.

General: "Temperate" zones. The so-called "temperate" zones occupy about one-half of the earth's surface. As a whole, they are *temperate* only in that their mean temperatures and their physiological effects are intermediate between those of the tropics and those of the polar zones. The north temperate zone includes the greatest known extremes of temperature. If the use of the word "temperate" were not so firmly established, it would be well to change the name to *intermediate,* or to *middle.*[1]

A marked changeableness of the weather is a striking characteristic of these zones. Apparently irregular and haphazard, these continual weather changes nevertheless run through a fairly systematic series, although they are essentially non-periodic. Climate and weather are by no means synonymous over most of the extra-tropical latitudes.

Temperature. The mean annual temperatures at the margins of the north temperate zone differ by more than 70°. The ranges between the

* See this *Journal*, p. 302 for Part I,—*The Tropics*. This article is intended to give an outline only. For further general information reference may be made to the world charts of temperature, winds, cloudiness, rainfall, etc., given with greater or less completeness in the various text-books of meteorology, and, very fully, in the *Atlas of Meteorology*. Detailed information must be obtained from special studies of local climatology.

[1] North-middle and south-middle would then distinguish the zones in the two hemispheres. (See W. M. Davis: *The Temperate Zones*, this *Journal*, Vol. I, 1897, 139-143.) "Temperate" does, however, apply fairly well to the south temperate zone.

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mean temperatures of hottest and coldest months reach 120° at their maximum in northeastern Siberia, and 80° in North America. A January mean of -60° and a July mean of 95°, and maxima of over 120° and minima of -90°, occur in the same zone. In the districts of lowest winter minima the mean summer temperatures exceed 85°, and in portions of the districts of highest mean summer maxima the mean winter minima fall below 32°. Such great ranges characterize the extreme land climates. Under the mild influence of the oceans, the windward west coasts have much smaller ranges than the interiors; the seasonal differences increase inland. The annual ranges in the middle and higher latitudes exceed the diurnal, the conditions in much of the torrid zone being exactly reversed. Over much of the oceans of the temperate zones the annual range is less than 10°. In the south temperate zone there are no extreme ranges, the maxima, slightly over 30°, being near the margin of the zone in the interior of South America, South Africa, and Australia. In these same localities the diurnal ranges rival those of the north temperate zone.

The northeastern Atlantic and northwestern Europe are about 35° too warm for their latitude in January, while northeastern Siberia is 30° too cold. The lands north of Hudson's Bay are 25° too cold, and the waters of the Alaskan Bay 20° too warm. In July, and in the southern hemisphere, the anomalies are small. The lands which are the center of civilization in Europe average too warm for their latitudes. The diurnal variability of temperature is greater in the north temperate zone than elsewhere in the world, and the same month may differ greatly in its character in different years. One winter in higher latitudes may have much snow, and temperatures below normal; the next may give much rain instead of snow, and the ground may remain unfrozen. One summer may be very favorable for crops; the next may give a poor harvest.

From the point of view of temperature, these zones may be considered in three divisions: (1) the subtropical, (2) the "temperate" latitudes, and (3) the sub-polar. The annual temperature curve has one maximum and one minimum. In the continental type, the times of maximum and minimum are about one month behind the maximum and minimum insolation dates. In the marine type, the retardation may amount to nearly two months. Coasts and islands have a tendency to a cool spring and warm autumn; continents, to similar temperatures in both spring and fall.

Pressure and Winds. The prevailing winds are the "westerlies," which occupy about as much of the earth's surface as do the easterly trades. The westerlies are, however, much less regular than the trades. They vary greatly in velocity in different regions and in different seasons, from

a light wind to a gale of fifty or more miles an hour. They are stronger in winter than in summer. They are much interfered with, especially in the higher northern latitudes, by seasonal changes of temperature and pressure over the continents, whereby the latter establish, more or less successfully, a system of obliquely outflowing winds in winter and of obliquely inflowing winds in summer. On the eastern coast of Asia there is a complete reversal in wind direction at the opposite seasons, but usually the seasonal shift is much less than 180°. In summer, when the lands have low pressure, the northern oceans are dominated by great oval areas of high pressure, with outflowing spiral eddies, while in winter, when the northern lands have high pressure, the northern portions of the oceans develop cyclonic systems of inflowing winds over their warm waters. All these great continental and oceanic systems of spiraling winds are important climatic controls.

The westerlies are also much confused and interrupted by storms. Hence their designation of stormy westerlies. A constant succession of cyclones, and the accompanying anti-cyclones, traveling along with the prevailing westerlies, cause the latter very frequently to change direction in order to become part of a cyclonic or an anticyclonic whirl. In these storms, velocities of eighty or more miles an hour may be reached at sea. So common are such interruptions that the prevailing westerly wind direction is often difficult to discern without careful observation. Cyclonic storms are most numerous and best developed in winter. The irregular pressure changes during the passage of high or low pressure areas usually wholly mask the faint diurnal variation of the barometer which is so characteristic of the tropics, and which becomes less and less marked with increasing latitude. Although greatly interfered with near sea level by continental changes of pressure, by cyclonic and anticyclonic whirls, and by local inequalities of the surface, the eastward movement of the atmosphere remains very constant aloft. The drift of the higher clouds, and wind observations on mountains, show clearly that the upper currents blow with great steadiness from westerly points, the departures being temporary, and under the control of passing cyclones or anticyclones. The south temperate zone is chiefly water. Hence the westerlies are but little distorted by continental effects. They are strong and steady, and almost as regular as the trades. "Roaring forties" is a well-known designation for the southern middle latitudes, and between latitudes 40° and 60° S. the "brave west winds" blow with a constancy and a velocity found in the northern hemisphere only on the oceans, and then in a modified form. Storms, frequent and severe, characterize these southern hemisphere westerlies,

and easterly wind directions are temporarily noted during their passage. Voyages to the west around Cape Horn against head gales, and in cold, wet weather, are much dreaded. South of Africa and Australia, also, the westerlies are remarkably steady and strong. The winter in these latitudes is stormier than the summer, but the seasonal difference is less than north of the equator.

Between trades and westerlies lies a debatable belt of high pressures, shifting seasonally. Within it stormy westerlies and drying trades alternately hold sway. It is the sub-tropical belt, a favored climatic region, where invalids seek health, and an escape from the rigors of a cold winter is found by many who have time and means to leave their northern homes.

Rainfall. Rainfall is fairly abundant over the oceans and also over a considerable part of the lands (30-80 inches, and more). It comes chiefly in connection with the usual cyclonic storms, or in thunderstorms, but altitude often serves locally to increase this precipitation. So great are the differences, geographic and periodic, in rainfall produced by differences in temperature, topography, cyclonic conditions, etc., that none but the most general rules can be laid down. The equatorward margin of the temperate zone rains is clearly defined on the west coasts, at the points where the coast deserts are replaced by belts of light or moderate rainfall. Bold west coasts, on the polar side of lat. 40°, are very rainy (100 inches and more a year in the most favorable situations). The hearts of the continents, far from the sea, and especially when well enclosed by mountains, or when blown over by cool ocean winds which warm in crossing the land, have light rainfall (less than 10-20 inches). East coasts, receiving rain from moist winds blowing in from the adjacent oceans as monsoons, or in front of cyclonic storms, are wetter than interiors, but drier than west coasts. Winter is the season of maximum rainfall over oceans, islands, and west coasts, for the westerlies are then most active, cyclonic storms are then most numerous and best developed, and the cold lands chill the inflowing damp air. At this season, however, the low temperatures, high pressures, and tendency to outflowing winds over the continents are unfavorable to rainfall, and the interior land areas as a rule then have their minimum. The warmer months bring the maximum rainfall over the continents. Then conditions are favorable for inflowing damp winds from the adjacent oceans; there is the best opportunity for convection; thundershowers readily develop on the hot afternoons; the capacity of the air for water vapor is greatest. Continents, from equator to higher latitudes, thus have a tendency to maximum rainfall in the warm season: summer rains as a whole predominate over the lands. The marine type of rainfall,

with a winter maximum, extends in over the western borders of the continents, and is also found in the winter rainfall of the sub-tropical belts. These winter rains are in some respects like the winter rains on windward coasts in the trades. Coastal lands reached by them are well watered, and droughts need not be feared. Rainfalls are heaviest along the tracks of most frequent cyclonic storms.

For continental stations the typical daily march of rainfall is shown in the accompanying data for Berlin and New York.

Daily March of Rainfall (thousandths of the daily mean)

I. *Continental Type.*

Hours.	*Berlin.*	*New York.*
Midnight—2 A.M.	76	79
2-4	83	85
4-6	74	79
6-8	69	80
8-10	62	74
10-Noon	68	81
Noon—2 P.M.	85	83
2-4	105	95
4-6	104	91
6-8	113	90
8-10	83	85
10-Midnight	78	78

The chief maximum is in the afternoon, and the secondary maximum comes in the night or early morning. The chief minimum comes between 10 A.M. and 2 P.M. Coast stations generally have a night maximum and a minimum between 10 A.M. and 4 P.M., as illustrated in the following data for Valentia:

Daily March of Rainfall at Valentia (thousandths of daily mean)

II. *Marine Type.*

Midnight—2 A.M.	88
2-4	93
4-6	93
6-8	90
8-10	84
10-Noon	76
Noon-2 P.M.	74
2-4	75
4-6	80
6-8	82
8-10	82
10-Midnight	83

Humidity and Cloudiness. Arrhenius gives the mean cloudiness for different latitudes as follows:

70°N.	60°	50°	40°	30°	20°	10°	Eq.	10°	20°	30°	40°	50°	60°S.
59	61	48	49	42	40	50	58	57	48	46	56	66	75

The higher latitudes of the temperate zones thus have a mean cloudiness which equals and even exceeds that of the equatorial belt. The amounts are greater over the oceans and coasts than inland. The belts of minimum cloudiness are at about lat. 30°N. and S. Over the continental interiors the cloudiest season is summer, but the amount is never very large. Otherwise, winter is generally the cloudiest season, with a fairly high mean annual amount.

The absolute humidity as a whole decreases as the temperature falls. The relative humidity averages ninety per cent. more or less, over the oceans, and is high under the clouds and rain of cyclonic storms, but depends, on land, upon the wind direction, winds from an ocean or from a lower latitude being damper, and those from a continent or from a colder latitude being drier.

Seasons: Their Effects on Man. Seasons in the temperate zones are classified according to temperature—not, as in the tropics, by rainfall. The four seasons are important characteristics of these zones, especially of the middle latitudes of the north temperate zone. Here spring and autumn intervene as transition seasons between the colder winter and warmer summer. Towards the equatorial margins of the zones the difference in temperature between summer and winter becomes smaller, and the transition seasons weaken and even disappear. At the polar margins, the change from winter to summer, and *vice versa,* is so sudden that there also the transition seasons disappear.

These seasonal changes are of the greatest importance in the life of man. The monotonous heat of the tropics, and the continued cold of the polar zones are both depressing. Their tendency is to operate against man's highest development. The seasonal changes of the temperate zones stimulate man to activity. They develop him physically and mentally. They encourage higher civilization. A cold, stormy winter necessitates forethought in the preparation of clothing, food, and shelter during the summer. Carefully planned, steady, hard labor is the price of living in these zones. Development must result from such conditions. In the warm, moist tropics, life is too easy. In the cold polar zones it is too hard. Temperate zone man can bring in what he desires of polar and tropical products, and himself raises what he needs in the great variety of climates of the inter-

mediate latitudes. Near the poles the growing season is too short. In the moist tropics it is so long that there is little inducement to labor at any special time. The regularity and the need of outdoor work during a part of the year are important factors in the development of man in the temperate zones.

Weather. An extreme changeableness of the weather, depending on the succession of cyclones and anticyclones, is another characteristic. For most of the year and most of the zone settled weather is unknown. The changes are most rapid in the northern portion of the north temperate zone, especially on the continents where the cyclones travel fastest. The nature of these changes depends on the degree of development, the velocity of progression, the track and other conditions of the disturbance which produces them. The changes may be sudden and marked or faint and slow; the wind may back or veer; the precipitation may be heavy or light; the wind velocity may be light or of hurricane force; anticyclones may be clear or may have clouds, and not infrequently precipitation. There is an almost endless variety of such examples. The detailed study of these varying phases of cyclonic and anticyclonic weather controls belongs to meteorology. It suffices here to say that the particular weather types resulting from this control give the climates their distinctive character, and that the study of climate through these types is the only method of appreciating the actual conditions. Annual and monthly averages of the different climatic elements alone are misleading, and give but a lifeless picture. The cyclonic unit, although its period is irregular and of varying length, is an essential basis of computation and comparison.

The weather types vary with the season and with the geographical position. They result from a combination, more or less irregular, of periodic diurnal elements, under the regular control of the sun, and of non-periodic cyclonic and anticyclonic elements. In summer, on land, when the cyclonic element is weakest and the solar control is the strongest, the dominant types are associated with the regular changes from day to night. Daytime cumulus clouds; diurnal variation in wind velocity; afternoon thunderstorms, with considerable regularity, characterize the warmest months over the continents and present an analogy with tropical conditions. Cyclonic and anticyclonic spells of hotter or cooler, rainy or dry, weather, with varying winds differing in the temperatures and the moisture which they bring, serve to break the regularity of the diurnal types. On the oceans the diurnal characteristics are much less marked.

In winter, the non-periodic, cyclonic control is strongest. Local conditions of heat and cold become subordinate to the general control by the cyclone, which imports weather from a distance. The irregular changes

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from clear to cloudy, from warmer to colder, from dry air to snow or rain, extend over large areas, and show little diurnal control. Spring and fall are transition seasons and have transition weather types. In spring, the growing diurnal quality is marked in the increasing importance of local controls, the appearance of convectional phenomena such as spring rains; the struggle between the cyclonic and the solar controls of temperature, now one and now the other being paramount, but the latter gaining and the former losing. Cold spells, with cyclonic winds and clouds, recall winter. Warm spells, with marked diurnal temperature range, presage summer. In autumn the decreasing frequency and importance of diurnal phenomena, such as thundershowers, high afternoon temperatures and the like; the active radiation and cooling during the longer nights, with resulting fogs; and the increasing control by the cyclone, point to winter's coming.

Weather types thus differ with the seasons. They differ also in continental and marine climates. They differ according to topography and cyclonic and anticyclonic tracks. The south temperate zone oceans have a constancy of non-periodic cyclonic weather changes through the year which is only faintly imitated over the oceans of the northern hemisphere. Winter types differ little from summer. The diurnal control is never very strong. Stormy weather prevails throughout the year, although the weather changes are more frequent and stronger in the colder months.

Climatic Subdivisions. From whatever point of view the temperate zones be considered, it is clear that there are fundamental differences between the north and south temperate. The latter is sufficiently individual to be given a place by itself. The marginal sub-tropical belts must also be considered as a separate group by themselves. The north temperate zone as a whole includes large areas of land, stretching over many degrees of latitude, as well as of water. Hence it embraces so remarkable a diversity of climates that no single district can be taken as typical of the whole. Its climate has been called "a crazy quilt of patches." It is a zone of marked seasonal variations and of great extremes, annual, diurnal, cyclonic. The simplest and most rational scheme for a classification of these climates is based on the fundamental differences which depend upon land and water; upon the prevailing winds, and upon altitude. Thus there are the ocean areas and the land areas. The latter are then subdivided into western (windward) and eastern (leeward) coasts, and interiors. Mountain climates remain as a separate group.

South Temperate Zone. If the climate of the north temperate zone is a "crazy quilt of patches," that of the south temperate is a piece of fairly uniform texture and appearance throughout. This is the effect of the large ocean surface. The whole meteorological régime is more uniform

than in the northern zone. Although the solar climate of the southern hemisphere is more severe than that of the northern, the physical climate is very much less extreme. It has been pointed out that this zone may properly be called "temperate;" that its temperature changes are small; its prevailing winds are stronger and steadier than in the northern hemisphere; its seasons more uniform; its weather prevailingly stormier, more changeable, and more under cyclonic control. The uniformity of the climatic conditions over the far southern oceans is monotonously unattractive. The continental areas are small, and develop to a limited degree only the more marked seasonal and diurnal changes which are characteristic of lands in general. The summers are less stormy than the winters, but even the summer temperatures are not high. Such an area as that of New Zealand, with its mild climate and fairly regular rains, is really at the margins of the zone, and has much more favorable conditions than do the islands farther south. These islands, in the heart of this zone, have dull, cheerless and inhospitable climates, with snow sometimes in midsummer. The zone enjoys a good reputation for healthfulness, which fact has been ascribed chiefly to the strong and active air movement, the relatively drier air than in corresponding northern latitudes, and the cool summers. It must be remembered, also, that the lands are mostly in the subtropical belt, which possesses peculiar climatic advantages, as will be seen. The northern oceans repeat, in a much modified form, many of the characteristics of the south temperate oceans. Except to leeward of the broad lands, the northern oceans have the conservative features typical of marine climates the world over.

Sub-tropical Belts: Mediterranean climates. At the tropical margins of the temperate zones, in the latitudes of the tropical high pressure areas, are the so-called sub-tropical belts. Far enough from the equator to be free from continued high temperatures, and near enough to it to be spared the extreme cold of higher latitudes, these transition belts are among the most favored of the world. Their rainfall regime is alternately that of the westerlies and of the trades. They are thus associated, now with the temperate and now with the torrid zones. In winter, the equatorward migration of the great pressure and wind systems brings these latitudes under the control of the westerlies, whose frequent irregular storms give a moderate winter precipitation. These winter rains recall the winter trade rains of the torrid zone, although their origin is different. They are not steady and continuous, but are separated by spells of fine sunny weather. The amounts vary greatly.[1]

[1] In round numbers, Lisbon has 28.60 inches; Madrid, 16.50; Algiers, 28.15; Nice, 33.00; Rome, 9.90 Ragusa, 63.90.

In summer, when the trades are extended polewards by the outflowing equatorward winds on the eastern side of the ocean highs, mild, dry, and nearly continuous fair weather prevails, with general northerly winds.

The sub-tropical belts of winter rains and dry summers are not very clearly defined. They do not extend continuously around the world. They are mainly limited to the western coasts of the continents, and to the islands off these coasts in latitudes between about 28° and 40°. Their degree of development, and importance, vary in different longitudes. The subtropical belt is exceptionally wide in the Old World, and reaches far inland there, embracing the countries bordering on the Mediterranean in southern Europe and northern Africa, including the Azores and the famous Riviera, and then extending eastward across the Dalmatian coast and the southern part of the Balkan peninsula into Syria, Mesopotamia, Arabia north of the tropic, Persia and the adjacent lands. In the great eastward extension of the winter rains in this area, the development of secondary lows over the Mediterranean Sea is an important factor. The fact that the Mediterranean countries are so generally included has led to the use of the name "Mediterranean climates." Owing to the great irregularity of topography and outline, the Mediterranean province embraces many varieties of climate, but the dominant characteristics are the mild temperatures, except on the higher elevations, and the sub-tropical rains.

On the west coasts of the two Americas the subtropical belt of winter rains is clearly seen in California and in northern Chile, on the west of the coast mountain ranges. Between the region which has rain throughout the year from the stormy westerlies, and the districts which are permanently arid under the trades, there is an indefinite belt over which rains fall in winter. In southern Africa, which is controlled by the high pressure areas of the South Atlantic and South Indian Oceans, the southwestern coastal belt has winter rains, decreasing to the north, while the east coast and adjoining interior have summer rains, from the southeast trade. Southern Australia is climatically similar to South Africa. In summer the trades give rainfall on the eastern coast, decreasing inland. In winter the westerlies give moderate rains, chiefly on the southwestern coast. Northern Chile, California, southwestern Australia and the Cape province of Africa are thus all in the subtropical belt.

The subtropical climates follow the tropical high pressure belts across the oceans, but they do not retain their distinctive character far inland from the west coasts of the continents (except in the Mediterranean case), nor on the east coasts. On the latter, summer monsoons and the occur-

rence of general summer rains interfere, as in eastern Asia and in Florida.

Strictly winter rains, with a maximum in December or in June, according to the hemisphere, are typical of the coasts and islands of this belt. The more continental areas have a tendency to spring and autumn rains. The rainy and dry seasons are most marked at the equatorward margins of the belt. With increasing latitude, the rain is more evenly distributed through the year, the summer becoming more and more rainy until, in the continental interiors of the higher latitudes, the summer becomes the season of maximum rainfall. The monthly distribution of rainfall in two subtropical regions is shown in the accompanying data and curves.

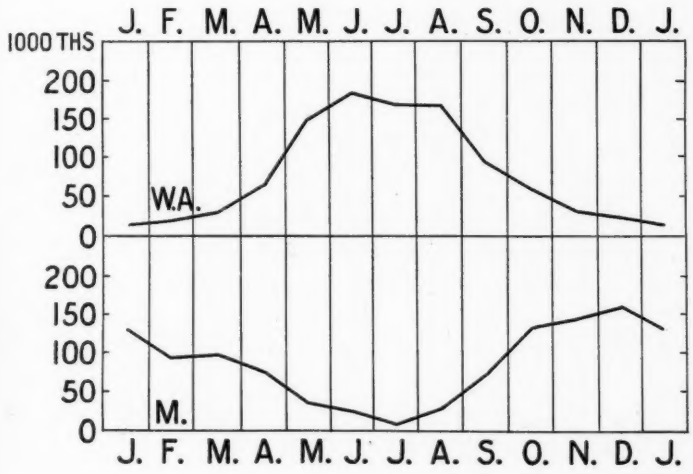

FIG. 1

Monthly Distribution of Rainfall; Subtropical Winter Rains.
(In thousandths of the annual mean)

M.=Malta; W. A.=Western Australia.

Monthly Distribution of Rainfall (in thousandths of the annual mean):

Subtropical Winter Rains.

	Western Australia	Southern Italy Sicily Malta
Latitude	32.3°S.	About 38°N.
January	14	130
February	18	93
March	30	98
April	64	75
May	150	35
June	183	23
July	168	8
August	166	28
September	93	73
October	59	133
November	32	144
December	23	160

The following table (from Supan), giving the seasonal distribution of rainfall in southern Europe, in percentages of the annual mean, shows very clearly the change in the rainfall season in going from north to south. In the northern Tyrol, the normal type of central Europe prevails. In Sicily, the summer is almost rainless: the subtropical type is fully developed.

Seasonal Distribution of Rainfall in Central and Southern Europe
(in percentages of the annual mean)

	Winter	Spring	Summer	Autumn	Range
Northern Tyrol	16	24	37	23	9
Southern Tyrol	14	26	28	32	8
Po Valley	20	26	24	30	6
Central Italy	25	24	17	34	9
Southern Italy	31	25	11	33	11
Sicily	39	22	3	36	15
Malta	48	14	2	36	22

In Alexandria the dry season lasts nearly eight months; in Palestine from six to seven months; in Greece about four months

The subtropical rains are peculiarly well developed on the eastern coast of the Atlantic Ocean, and are clearly illustrated in the accompanying diagram, after Supan.

The different types of rainfall are as follows:

I. North of lat. 40°N. Rain throughout the year.

II. Lats. 40°-27°N. Dry in summer (subtropical rains).

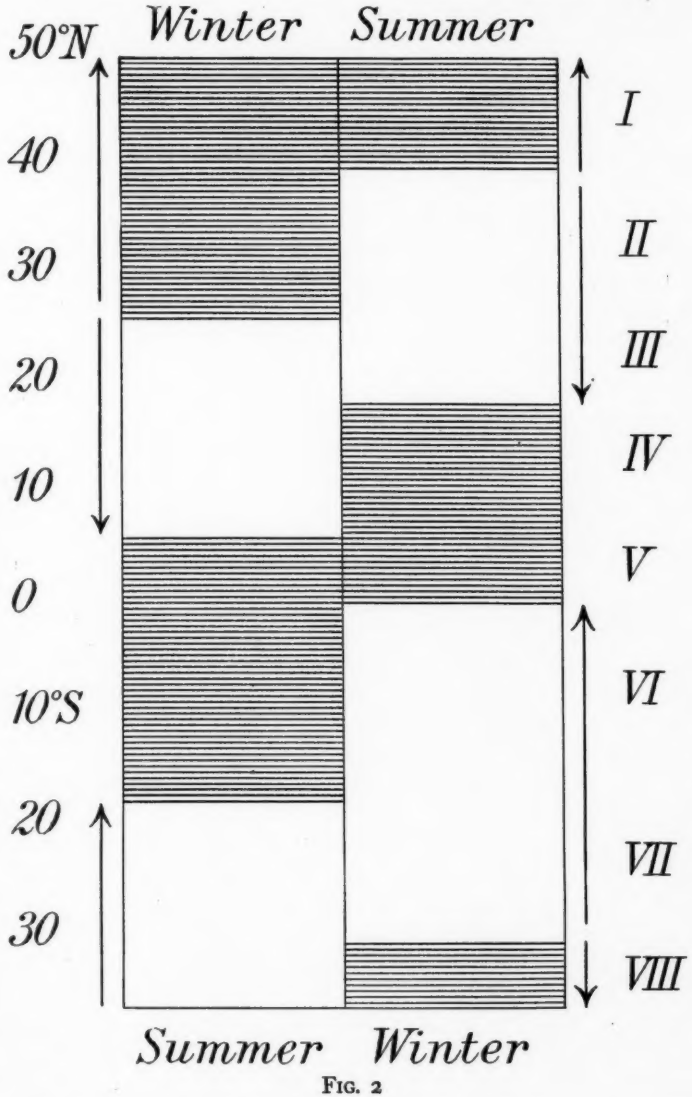

FIG. 2

Rainy and Rainless Zones on the Eastern Atlantic Coast in Winter and Summer.

III. Lats. 27°N.-19°N. Always deficient in rainfall.
IV. Lats. 19°N.-7°N. Dry in winter (tropical rains).
V. Lats. 7°-1°N. Always rainy (equatorial belt).
VI. Lats. 1°N.-17°S. Dry in winter (tropical rains).
VII. Lats. 17°-30°S. Always dry.
VIII. Beyond lat. 30°S. Always dry.
(IX. Always rainy on the oceans. The African west coast does not extend into this zone).

The winter rains which migrate equatorward are separated by the Sahara from the equatorial rains which migrate poleward. An unusually extended migration of either of these rain belts may bring them close together, leaving but a small part, if any, of the intervening desert actually rainless. The Arabian desert occupies a somewhat similar position. Large variations in the annual rainfall, and droughts, may be expected towards the equatorial margins of the subtropical belts.

The main features of the subtropical rains east of the Atlantic are repeated on the Pacific coasts of the two Americas. In North America, the rainfall decreases from Alaska, Washington and northern Oregon south-

*Table of Mean Monthly Temperatures for Selected Sub-tropical Stations.**

	Continental		Insular	
	Bagdad	Cordoba	Bermuda	Auckland
Lat.	33°19′N	31°25′S	32°20′N	36°50′N
Long.	44°26′E	64°12′W	64°43′W	174°51′E
Altitude	39 ft.	1440 ft.	148 ft.	276 ft.
January	50.9°	73.4°	62.4°	67.1°
February	53.1	72.3	61.9	67.5
March	62.1	68.4	61.7	65.5
April	69.3	61.0	64.4	61.5
May	82.0	54.5	69.6	56.7
June	89.6	49.1	74.8	53.2
July	92.8	50.0	78.8	51.8
August	92.7	54.3	80.1	52.2
September	85.6	58.6	78.1	54.5
October	76.5	63.5	73.4	57.4
November	62.1	68.5	67.6	60.3
December	52.5	71.8	63.7	64.8
Mean	72.5	62.1	69.6	59.4
Range	41.9	24.3	18.4	15.7

*Given to nearest tenth of a degree Fahr.

wards to lower California, and the length of the summer dry season increases. The mean annual rainfall [1871-1901] at Neah Bay, Wash., is 112.40 inches; at San Francisco, Cal., 22.83 inches and at San Diego, Cal., 9.40 inches. At San Diego, six months (May-October) have each less than

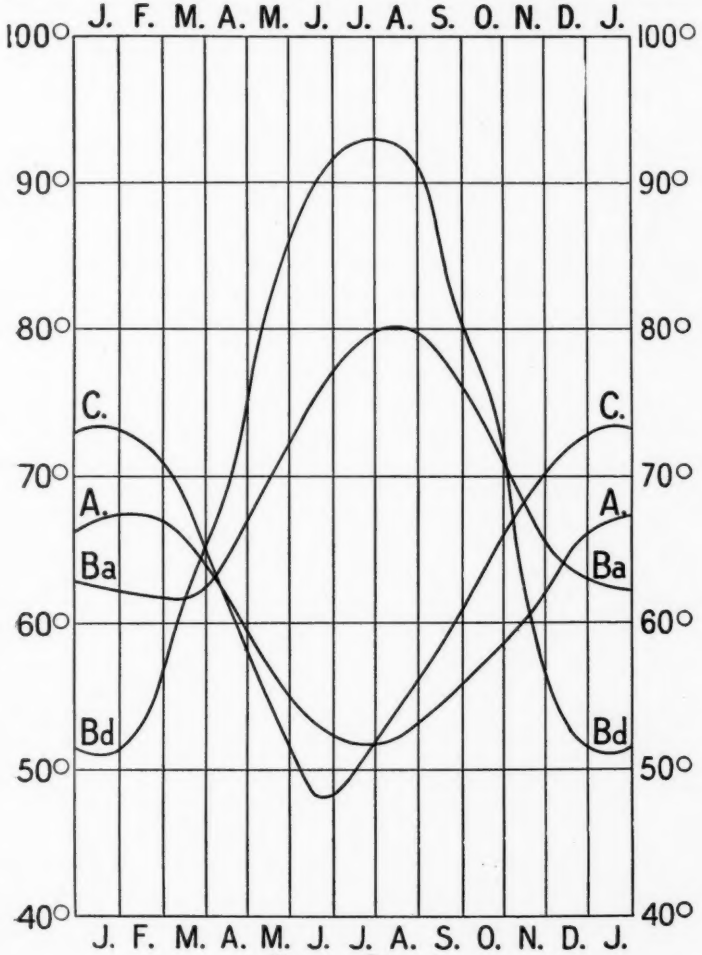

FIG. 3. Curves.

Mean Monthly Temperatures for Selected Sub-tropical Stations.

Bd.=Bagdad; Ba.=Bermuda; A.=Auckland; C.=Cordoba.

five per cent. of the annual precipitation, and four of these have one per cent. The southern extremity of Chile, from about latitude 38°S. southward, has heavy rainfall throughout the year from the westerlies, with a winter maximum. Northern Chile is persistently dry. In between there are winter rains and dry summers. Neither Africa nor Australia extends far enough south to show the different members of this system well. New Zealand is almost wholly in the prevailing westerly belt. Northern India is unique in having summer monsoon rains and also winter rains, from weak cyclonic storms which correspond with the subtropical winter rains.

From the position of the subtropical belts to leeward of the oceans, and at the equatorial margins of the temperate zones, it follows that their temperatures are not extreme. Further, the protection afforded by mountain ranges, as by the Alps in Europe and the Sierra Nevada in the United States, is an important factor in keeping out extremes of winter cold. The annual march, and ranges, of temperature depend upon position with reference to continental or marine influences. This is seen in the accompanying data and curves for Bagdad, Cordoba, Bermuda and Auckland.

Autumn is as a rule a good deal warmer than spring, as in all the eastern Mediterranean basin, the Canaries, and Madeira. This basin is particularly favored in winter, not only in the protection against cold afforded by the mountains but also in the high temperature of the Sea itself. The southern Alpine valleys and the Riviera are well situated, having good protection and a southern exposure. The coldest month usually has a mean temperature well above 32°. Mean minimum temperatures of about, and somewhat below, freezing occur in the northern portion of the district,[1] and in the more continental localities minima a good deal lower have been observed. (At San Diego, Cal., the absolute minimum is 32°; at San Francisco, 29°.) Mean maximum temperatures of about 95° occur in northern Italy, and of still higher degrees in the southern portions. Somewhat similar conditions obtain in the subtropical district of North America. Under the control of passing cyclonic storm areas, hot or cold winds, which often owe some of their special characteristics to the topography, bring into the subtropical belts, from higher or lower latitudes, unseasonably low or high temperatures. These winds have been given special names (mistral, sirocco, bora, chamsin, leste, leveche, pampero, southerly burster, etc.)

These belts enjoy abundant sunshine, being among the least cloudy districts in the world. The accompanying data and curve, giving an average for ten stations, show the small annual amount of cloud, the winter

[1] Nice, 30.4°; Rome, 25.7°; Palermo, 32°; Athens, 28.8°.

maximum and the marked summer minimum, in a typical subtropical climate.

Monthly Distribution of Cloudiness in a Subtropical Climate.

(Eastern Mediterranean, Lat. 33.8N.)

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
4.9	4.6	3.8	3.7	2.8	1.3	1.1	1.3	1.8	2.5	4.0	4.7	3.0

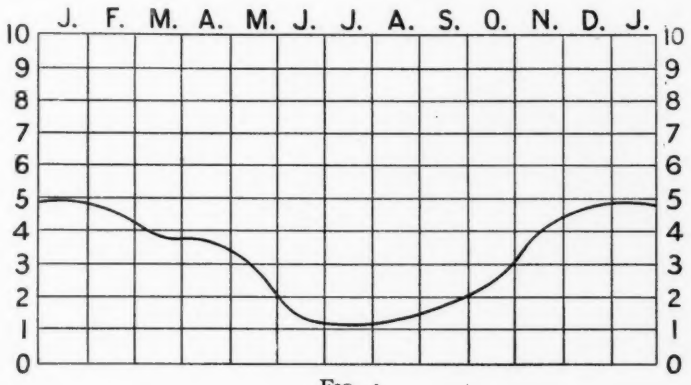

FIG. 4

Monthly Distribution of Cloudiness in a Subtropical Climate. (Eastern Mediterranean)

The winter rains do not bring continuously overcast skies; and it has been well said that the problem of securing a maximum rainfall with a maximum number of clear days has been solved on the southern Alpine slopes. A summer month with a mean cloudiness of ten per cent. is not exceptional in the drier parts of the subtropics. The winter cloudiness in northern Italy is 5.0 to 6.0; in summer, 3.0 to 4.0. Cairo has an annual mean of 1.9, and June has 0.8. Biskra, on the northern margin of the Sahara, has 264 clear days. In the central valley of California the number of clear days is similarly very large.

With prevailing fair skies, even temperatures, and moderate rainfall, the subtropical belts possess many climatic advantages which fit them for health resorts. The long list of well-known resorts on the Mediterranean coast, and the shorter list for California, bear witness to this fact.

(To be continued)

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NEWSPAPER LETTERS FROM THE FORBIDDEN BALKANS.

BY FELIX J. KOCH,
Cincinnati, Ohio.

I.—TO-DAY IN MACEDONIA, AND THE APOSTLES OF BULGARIA

THE situation in Macedonia to-day is, without a doubt, the most complicated, and certainly the most perplexing of any that has existed in these turbulent vilayets since the days of the Thessalonians. Heretofore it has been the story of Turk against Christian that has occupied Europe's attention, but now, added to this, is the internecine war fought among the Christian peoples themselves, and again between these and the Spanish Jews in certain districts. So, in addition to being made up of a polyglot of nations, to-day Macedonia is made up of clan fighters such as no Scotch border ever equaled for ferocity. And in all this strife and turmoil, after spending some six weeks in touring Macedonia, I have come to the conclusion that the Turk is to be pitied, not blamed.

So far as the Turkish side of the errors of omission and commission in Macedonia go, they are too well-known to attract attention. The Reform Commission was at work all of last summer, and in many places has found these not to be so grievous after all. The worst of the number has to do with the farming of taxes, whereby a publican pays the Vali or kaimakan of province or district so much per year for the taxes of that area, and is then permitted to keep whatever else he may force from the peasants. This tax is paid in kind, very largely, and upon assessment. By the new reform program, several villages have the tax paid upon actual yield and contentment reigns supreme.

The terrorists in Macedonia to-day are the "bands." We read almost daily in our papers of attacks upon the "villages," by such and such a band, and then the number of slaughtered and mutilated. Details are not given, because of their commonplaceness to the press correspondent. Recently, in Salonica, a "pope" was assaulted and killed in the streets, for no cause beyond the fact that he was of the Greek Church,—and nothing was thought of the matter. Near Salonica is a little village that is living in a state of perpetual fear of destruction by Bulgar "patriots." The Turkish government stations no patrol here, for, if it did, it would need to do likewise in a thousand other hamlets, suffering like fears.

The story of Macedonia to-day is a study of religious imperialism.

Behind all the stories of Moslem atrocities lies the dream of empire in Macedonia. The Bulgarian looks back to the days of the great Bulgar czardom; the Greek is looking to a pan-Hellenic republic, or, if need be, monarchy, that shall extend north to Monastir and Uscub; the Albanian longs for the restoration of full-fledged Turkish autocracy, without consuls of foreign powers, on every hand, to interfere, and the Rouman is beginning to stir himself for possession of the same area. But the struggle has as yet come only between the Greek and the Bulgar.

Macedonia is a land of four cities—and villages. Cities, the Ottoman Empire over, are much alike; but the villages in this border land are like some outposts of civilization where predatory bands are ever to be feared and where life is as it was at the time of the robber knights or of the Völker-wanderungen.

One rides from Monastir out a miserable road filled with ruts, preventing rapid progress, among fields where the Cape buffalo, the great draught animal, wallows, and on to the foothills blue in haze and tantalizing for their very danger. Alone we may not penetrate this area, though it be no farther from a county-seat than New York from Brooklyn. The road winds and then suddenly narrows and we come to a village of two thousand-odd people. We may ride through the town and see no sign of life beyond the dogs and a stray hog at the roadside. Thick rock walls rise up from the street, binding house wall to house wall, and in this narrow little doors give access to the garden only. Not even windows are placed on the lower floor of the home, which stands directly at the road side, in order that, as one goes through, there may be only the thick walls for landscape, and incidentally to protect the tenants. Now and then a lad drives a herd of the long-horned Macedonian goats down this narrow alley way, and the tinkle of their bells assures us we are not in a deserted village. A gate opens, and some woman appears in coat and skirt of black, relieved by white sleeves heavily embroidered, to throw her refuse into the road that the dogs may gather and clear it. Then, again, there is silence.

If we pass into this enclosed garden, we shall pity it for its poverty. A hickory tree and a zenia bed, a few outbuildings and a rubbishheap—and that is all.

One leaves his clogs of wood at the door to pass into the dwelling. The floor is earth, the ceiling puncheon, the walls crudely whitewashed. There are two chairs, a table, and some benches; and here the peasant loiters. Life in the fields cannot consume all one's time—the fields are

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altogether too narrow, and so, for safety's sake, the peasants return to their homes, incidentally their fortress, to lounge through the monotonous hours. And in the winter they rarely, if ever, quit these mansions. A low, dark hall, that forms excellent hiding-place for the refugee, leads on to a rear portico, where beans dry in heaps and the matting covers for the buffalo wagons are thrown; and here the women sit and spin on summer afternoons, or pickle their peppers, casting the refuse into a creek that runs within the garden walls below. High above there is another porch, a sort of look-out to detect the coming foe, and here the farmers' stock of peppers and tomatoes and mangoes dry, a blaze of crimson in the sun. Against the walls of the chambers on this floor a divan or two is built, or there may be a bundle of rags piled for bedding. Such is the Macedonian home.

Wealthier folk have a little mantel-shelf built above the hearth, or at either side the protruding chimney, where a few trinkets, cheap glasses, and a Bible repose. Now and then a rough-hewn bedstead, with tumbled pillows and red blankets and the family supply of clothing on a rack close by, may be added to the furnishings. Otherwise these simple homes are all alike.

Above the homes the church is built, the little dome marking it Greek, and under the row of locust-trees that shed their leaves so easily in Macedonia, the good pope gathers the children to "educate them," for, as he says, "by education alone can we combat the brutal 'Bulgars.'"

This, to-day, is Macedonia, and for this the most brutal warfare Europe has experienced in centuries is now being waged.

Folk rise at two in the morning here to work in their fields; they return home at five in the evening, from May to September, day after day the same, not excepting even the Sabbath. In the winter, the time is given over to lounging.

There is but one variation to the peaceful life of these folk, and that comes from the bands. Now and then there swoops down that narrow village street a band of possibly fifty to one hundred men. If the village be of the Greek faith, the band will be Bulgar, if it be Bulgarian, the opposite. Without mercy these men strike down every man, woman, and child who does not succeed in retreating behind the garden walls or into the houses. Firebrands are then produced, and between a fusillade of rocks from the villagers,—for no Christian peasant dare make it known that he possesses firearms in the Turkish Empire—the brigands set fire to the village, until finally the white flag is hoisted and a truce agreed upon.

Then it is the same story ever and ever—the "patriots" force every Greek in the village to swear allegiance to the Bulgarian Church. This done, they depart as they came.

The next day a Greek band may swarm through and force the poor peasants to retract, so that with the weight this spiritual guilt brings upon their souls, they do not know where they stand. And the reason for this armed conversion is—political.

Where the Tobacco and Peppers Dry on the Houses.

Bulgaria, the Pan-Greek party, and the other nationalities are looking forward to one of two events—the death of Franz Josef, or the assassination of Abdul Hamid. Either event, it is felt, will bring about an overthrow of the balance of power in Europe, and then Macedonia will be given to whichever of the buffer states has the largest majority of population. And so the bands are out, murdering and robbing, to intimidate and proselyte.

Just how dangerous the situation in Macedonia is to-day may be gleaned from a few examples.

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Across the little Bay of Salonica, opposite the great city of Salonica, the third largest metropolis of Turkey in Europe, rises Mt. Olympus, blue and beautiful, with a low chain of foothills in its shadows. It is but a two hours' sail over the bay to the mountain, and the view from the peak, "where the gods do dwell," is said to be deservedly "heavenly." But to ascend Mt. Olympus one needs take an escort of twenty or more soldiers, because of the brigand bands that infest this neighborhood, and make it the rendezvous for planning their descents into Macedonia.

Near Monastir there is a little village in which, recently, a score of Christians were slaughtered. The dragoman of one of the Consulates was my guide in Monastir, and with our fast little Macedonian sorrel we could have made the trip to the place in no time. But the authorities practically forbade the jaunt to this outlying suburb, because of—none knew just what.

Not even the main arteries of travel in Macedonia, the railways, are safe. In fact, to ride on a Macedonian train requires a complicated series of formalities. To enter Turkey, one needs, first of all, a *visé* on the passport from the Turkish Consul in his home country. Then, on reaching the border, this must be countersigned by the nearest Turkish Consul, and he inquires minutely as to one's profession and purposes in visiting the Empire. That done, he inscribes on the passport the point at which you intend disembarking, and if, as was the case with me at Uscub, disturbances should be on, it is only by the greatest possible amount of pressure being brought to bear that the foreigner will be given the right to descend there. This paper, then, must be certified by the consular scribe, and one leaves for the Ottoman Empire. On reaching the boundary passports are collected, registered, and returned. On leaving the train one passes through a grating, much like that of a customs boundary in other lands, and must show his passport in so doing. Arrived at the hotel, the passport is taken by the *hotelier* to the police and one obtains his "teskerèt," giving the right to walk the streets of the city. When the visitor would depart, he must obtain, through some Consul, permission from the police to go on, for before his ticket will be sold him at the depot he must present such permit on his "teskerèt." Natives, and notably Christians, find it most difficult to obtain passes from vilayet to vilayet and for leaving the country the difficulties are well-nigh insurmountable.

The entire railway system of Macedonia is policed. At distances equal almost to alternate telegraph poles stands a soldier, mounted and armed, instructed to shoot down any one tampering with the track. The engineer has powers of life and death in matters of transportation; and, in

addition, every train bears a *chef,* who is a full-fledged government official. Despite this, however, there have been a half-dozen dynamiting outrages on the railway connecting Salonica and Adrianople.

The degree of blame to be attached to the Turk for the situation to-day in Macedonia is difficult to fix. He is not a terrible fellow after all. In all southern Europe, excepting the Montenegrins, there is not a more hospitable, accommodating, friendly, generous, and peaceable body of men

A Native Han, or Inn, with the Coffee Drinkers.

than the Turks of Macedonia. One does not enter a railway compartment, one does not drop into an inn; one does not, in fact, enter a Turkish village, before they besiege you with questions, and try to make things pleasant. Coffee and cigarettes are immediately offered the stranger, and these he *must accept.* They pose for the kodak; they lead us into their homes; they let us look over their bazaars. I would much rather spend a week in a Turkish village alone than to spend one hour without my guard in either the Bulgar or Greek hamlets of Macedonia.

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The Turk is usually let alone by the Greek and Bulgar, respectively, in their quarrels with one another. And so, in return, these are permitted to "fight their battles in peace." Abdul Hamid is working along a peculiar line of diplomacy in Macedonia. He believes in letting the Christian sects devour themselves, in order to keep their minds off the Government. He sides in with the weaker in the struggle, at all times (consequently the favor to the Rumanians to-day in Macedonia), and so fears none of his subjects. That this warfare will eventually tear Macedonia away from him, however, he does not seem to realize.

The Turkish massacres to-day come, not in punishment for these things; their origin is elsewhere. To the Turk, the infidel is, legally, as a dog, minus any civic rights. Among the Turks, as among all peoples, there is an occasional villain who will abuse a Christian woman, rob a Christian larder or cheat a Christian in a deal. Then, before a court, the infidel need hope to secure no redress. The infidel has no rights in Turkey. Appeal to the Turkish Government would be foolish. So the injury rankles. When it is repeated, it burns still more; and the peasant, knowing the Government will not avenge him, goes forth to avenge himself. A Turk is murdered, and despatches to the Sultan tell that the blood of the Moslem must be paid for. Orders are given the nearest Turkish garrison to kill the offender and his family, and this means license to murder and plunder, assault, and finally burn the entire village. The next day we read in our papers of another Macedonian atrocity.

As one Consul put it, "the cause of blood and iron in Macedonia is *not* that the Turks are cruel. The Turk is to be pitied. He is not in the habit of doing these things any more than are the citizens of my own country. But when the occasional Turk does a wrong, he is not properly punished. That is the cause of the Turkish atrocities."

In fact, the Consul says that in the case of a recent Bulgar village from which the bands expelled the inhabitants, excepting of course the few Moslems—who are never molested by these highwaymen—that the Turks tilled the ground, worked the crops, and garnered the sheaves for their late neighbors in their absence, and on their return accepted not a piaster in payment, doing the deed from pure altruistic motives. Such is the "Terrible Turk."

There is a note of sadness in the voice of the intelligent Turk, as he speaks of the situation to-day in Macedonia.

"If the Powers would only let us step in and punish these outrages, we would bring Macedonia to a state of peace in a month. Look at the interior of Asia; what do you hear from there? Nothing! And you would hear nothing of Macedonia either but for the agitators from out-

side. As soon as a foreigner is about to be punished, however, the Consul steps in and demands his release . . . . and simply because their sovereigns are looking to the eventual annexation of Macedonia. But," and a smile

A "Bulgar" Pope.

creeps over his face, "wait until we get another Sultan!" And for this all Europe is waiting.

Unless the successor of Abdul Hamid "makes good," it is probable that the salvation of Macedonia will be an occupation similar to that of Bosnia, by the Austro-Hungarians, where peace and plenty now reigns. To it certainly no strenuous objection could be made by any parties concerned. But that is a problem of to-morrow rather than to-day in Macedonia.

To the average mind the word "apostle" means one who is sent upon some important and elevating business; to the inhabitant of this country, however, the word has a sinister meaning, founded on legitimate fear. The most terrifying band of men in all Europe, and probably in the civilized world, to-day call themselves apostles—the Apostles of Bulgaria. They number 125, all told, and led by a brigand, entitled Chief Apostle, they make the life of the inhabitants of European Turkey one of constant terror. Their haunts are the vilayet of Salonik, and recently their especial rendezvous has been this little hamlet of Gradobor, only two hours' ride from Salonica, the second largest city of European Turkey. Murder and rapine are their professions; kidnapping of wayfarers for ransom their pastime. On account of their presence in this immediate vicinity one would not dare make the brief trip from Salonica to Gradobor unattended. Though Greek bands of robbers (who are out ostensibly for revenge, but more particularly for plunder), have rendered such a trip precarious, the 125 Apostles make it worse. There are Greek bandits who seek plunder and revenge; and there are others who are out-and-out robbers; but none of them equal the Apostles, who are worse than either.

Nowhere, in Macedonia, is the traveler safe. This is not a figure of speech; it is a plain, hard fact. When one travels here, he must of necessity take his life in his hands. The Government can guarantee him nothing as regards personal safety. At Monastir the authorities have been waging a war against these bands—a war that is more romantic than effectual. Troups of robbers, usually composed of five or six brigands, made it their business to hold up and plunder travelers, or hold them for ransom. When their number is larger, say 15, murder and rapine are added to the program. And through it all the Government goes steadily on its way, making opera bouffe efforts to bring the offenders to bay, and steadily failing to accomplish its purpose.

When one recalls that a Chief of Police in Turkish domain gets but three and a half "napoleons" (less than $14 a month), and his subordinate less in proportion, it is obvious that a robber chieftain needs but to try a bribe on the Captain of the saptiets to get him to turn down a wrong defile or enter a wrong canyon when he is sent to capture the offenders.

Gradobor was suffering from a recent attack of the Apostles at the time of our visit. One of the foreign Consuls gives the particulars—none of the people themselves would dare do so. The Apostles captured three men whose families had informed against the bloodthirsty 125 last year. To show what informers might expect, the Apostles deliberately shaved the noses and ears off these men and then mutilated their bodies beyond recognition, leaving them as mute but terrifying reminders that non-Bulgarian sentiments must not be voiced.

Only a few days before five women were kidnapped near here by the Apostles. Two of them were killed; the other three carried off into the mountain fastnesses for a worse fate. In America you hear much of the Turks' outrages against women, but the Consul here tells that the Bulgarians are more fiendish. Not only that, but the band has women employed to further its propaganda of death. This Consul had occasion some months ago to investigate the charges of a Bulgarian damsel against a Turk. The inquiry developed the fact that she was a woman of the lowest repute, who had led the Moslem on, merely to involve the Turks, if possible, in a semi-international complication.

Some weeks ago a bomb was thrown in a delicatesse place on a main street of Salonica. The Turks were immediately blamed by every one for the affair, but investigation showed the Bulgarians the authors and the Apostles the perpetrators. No one but they could have so skillfully smuggled in the military apparatus found near the spot. A few days ago a ten-kilogram dynamite shell was discovered on the railroad track near Salonik, and simultaneously an infernal machine came to light at Annatavo. The latter was to have destroyed the bridge over the Wardar. The man in whose charge the machine was found was hanged. He was a Macedonian leader, Christian Mannof by name, and he declined to save his life by telling where he got the dynamite. The terrible 125 Apostles are therefore credited with the plot, and with reason, and the people are all the more afraid of them.

The 125 mete out certain death to any one reporting adversely on them, and the Reform Committee find it no easy matter to obtain statements that may lead to the arrest of the brigands. Grievances are usually sent in written, but even for this the Bulgarians on one occasion entered a hamlet near here and killed a number of Greeks as a lesson and warning to the rest.

"Two delegates to the commission, friends of mine, said one of the Consuls to me, "went into another village where atrocities on the part of the Bulgarians occurred, and what do you suppose the people there said about the Turks? Simply this: The Turks had tilled their fields, worked their crops and fed their stock all the time the people had been fleeing before the Bulgarians, and when those people had finally returned to take up their work again the Turks had asked not a metallic for their labor. From pure charity and altruism they had helped the residents of that portion of the country! And this is the 'terrible Turk' about whom America is so wrought up—and so much mistaken."

"If the Bulgarians did not cause him to steel his heart your Turk would be one of the best fellows in Europe." Thus spoke a Consul whose coun-

try's interests in the Balkans are diametrically opposed to Turkey's, and I fully agree with him. I would far rather be alone with a Turk in some wayside inn in old "Kovi-bazaar" than in a village of Greeks or Bulgarians on the railway.

People ask constantly if the Sultan is aware of conditions in his country. Every Consul assures that he is. Whatever the people of his court may try to withhold from him the Ambassadors, in direct audience, undoubtedly tell the defender of the faith, and he thereby knows the true state of affairs. But the young Turks say Abdul Hamid doesn't care. He is content with the name and dignity of Sultan, and he does not leave his capital. He gives orders; but if the powers behind the throne feel so inclined those orders are forgotten or let slip.

Ask about the Miss Stone case (for example) in Macedonia, and you will be answered that Saraffof did not receive the largest portion of the ransom, as was reported; that much of the money was well used, but that a large portion of it helped to form the first coffer of the terrible 125. Each chief of the Macedonian General Committee, when in the field, receives six Turkish pounds a month from Sofia, and while much of this war sinew comes from the peasantry, who pay taxes first to the Turks to be let alone and then to the Bulgarians for the same reason, many a dollar is reported turned into the war chest by the raiding apostles of Bulgaria.

To give them their due, these Apostles pay a shadowy vassalage to Saraffof, who is the leader still of the Macedonian movement, and many times Saraffof may be seen in the disguise of a milkman on the streets of Salonik holding converse with a few of his faithful band.

Men who are in close touch with the Apostles of Bulgaria feel that the Macedonians have given the Powers full time to try their reforms and have shown Europe that they must fail. Now Macedonia claims she will herself rise, since Europe will not lend her martial assistance.

If one go to Macedonia to learn the true grievances of the people, the causes that make possible the existence of blackmailing bands such as the 125, and the atrocities of which we are ever reading, one hears only of the taxes.

The tax grievance in this particular district is the tenth, or tax paid in kind on all produced. Great land owners, or Begs, force the peasants to till the Aga's territory first; after that they may work their own land. When the harvest is ready the peasant may not gather his until the agent of the Beg has taken out his 10 per cent. of the crop. If a peasant grumbles at the amount taken, the agent repays him by purposely delaying collections, so that the crop rots almost wholly in the field. The peasant may not remove a sheaf from the ground until the Beg's share has been taken out by his agent. In five casas, or districts, in this vilayet, reforms in tax

collection have been introduced, and the Consuls affirm that they are working well—but from the people themselves you cannot get information. Were they to talk, some of the 125 or of the Turks might hear—and what pleases one, displeases the other!

"Macedonia," said the Consul referred to above, "doesn't want to join Bulgaria any more than Bulgaria wants to join Russia, despite the fact that Macedonia recognizes Bulgaria as her liberator. Since the reforms

Village Girls Gathering Tobacco near Scene of Miss Stone's Capture.

of last year have gone in, the gendarmerie has done a good deal to improve conditions. Schools have been started at Salonica, Uscub, and Monastir. Houses that were destroyed have been restored by the civil commission. If Serb and Wallach, and Greek and Bulgar would only let each other alone and go about their own business, this would be a delightful country. But the 125 and the rest of the bands do not want to free Macedonia. They are not rising against the Turk, but each is looking to bring Macedonia to some other bribing power. Bribing is going on at Constantinople for favors to the Bulgarian cause in Macedonia. The Turks in this vilayet

actually fear the Bulgarians for the influence they may exert against them at the capital."

As to these schools of European Turkey Salonik boasts of one of the most modern schools in the Balkans. The building is a handsome three-story structure, painted in various shades of yellow, and having a broad

Almost at the Scene of Miss Stone's Capture.

garden surrounded by gratings. Just as the writer was about to enter the institution, two Turkish girls of 16 and 18, judging from their height—for one cannot see their faces—attracted attention. Coming presumably from the cemetery, they approached the fence stealthily, where one of the boy students was enjoying his recess. Near by a young Turk was playing. Immediately he took the cue, darted to the railing and the girls uncovered to him their faces. For a short time a whispered conversation took place, and they seemed to enjoy the semi-stolen interview. This gives you an idea of the spirit of the modern harem. The face is covered only because of the law; not out of individual choice. So, too, are matches being formed in the Orient. Ask any young Turk, and he will tell you it was mother or sister who used to recommend for her beauty or graces the bride to son

or brother, who was then wooed by bargains with the father; but now the young man recalls sweethearts of childhood days—for the girls begin to cover at 12 years, much later than formerly—and that in the years between the one of his choice frequently called upon him and uncovered her charming countenance for his admiration and pleasure.

Five hundred pupils are enrolled in this gymnasium, which strikes the traveler as being rather a good showing for a land where compulsory education is unknown; and the school is not yet twenty years old. The faculty numbers twenty, and the pupils are graded in eight classes. While the school is conducted as pension, over one hundred free students are supported by the Government, the expenses amounting to twelve Turkish pounds each per annum. Lads enter the school at any age between eleven and fifteen, taking three years of primary work before "making" the lycée. Matriculation admits to the University of Constantinople. Uniformity is maintained, but all religions are free to enter. Instruction is in Turkish, and a study of French is compulsory, while both Greek and Bulgarian are offered those who care to study these languages. A laboratory of physics, which is well equipped, is a novelty in this far-away town, but gives dignity to the school.

The City of the 125, old Salonik, of which we shall hear more in a subsequent paper, is one of the hottest places in Europe, in both senses of the word. Not only is robbery, murder and plot and counterplot always incubating here, but nature seems to have chosen this particular spot to show just how torrid she can make man's habitation. The wide pavements along the quays reflect the sun rays with dazzling brillancy, and the stones of the street soak up the heat all day, to give it off again at night multiplied, apparently, a thousand-fold. The breezes that blow from Mt. Olympus, the monster mountain peak of 2,373 meters, across the bay—"and only 80 kilometers from bandit land," as the Consul puts it—are powerless as soon as they strike the harbor. All their fragrance goes then, and, instead of cooling zephyrs, they turn into heat waves.

The city is built in amphitheater fashion at the foot of Mt. Kortalsch, but, huddling as it does within well-defined walls, as if dreading the lawless bands which have preyed upon its people so long, it is an oppressive place to live during the long summer. The tin roofs of the ramparts and minarets burn and scintillate throughout the blazing days, and the hot streets and narrow alleys offer no relief.

One dare not take notes in Salonik. It is a city of spies, and every one who enters its walls is considered guilty until he proves himself innocent. Even in the residence portion, the pretty suburb of Kalamria, on the east side of the harbor, where wide, square houses set in semi-tropical gardens prevail, and only people every one knows all about dwell, the heavy shut-

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ters stay shut all day and the little verandas on the upstairs center fronts are deserted. Not on account of the sun entirely, however, for Salonik is the place of places for spies, and, like the poor, they are always with Salonik. Therefore it behooves all who dwell in the city to beware; and they live under cover in consequence.

Wide though the avenues of the city be, modern the gas and water works, excellent the sewage system, and businesslike many of the enterprises therein, the system of espionage has been changed not a whit since the time of Haroun al Raschid. Though the sun beats down strongly enough in October to give the newcomer from the Occident the vertigo or even an occasional sunstroke, it does not drive off the spies set to watch his every movement. They are spies by choice and by instinct, and they work the trade both ways, reporting one thing to the police and another to the Apostles, if they be not Apostles themselves. What a spy's talebearing may lead to is ever a terrifying question in the minds of the people of Salonik. The ranks of the dreaded 125 are made up from Bulgarians, almost wholly; but they are not particular concerning nationality when they are out for victims.

Standing sentinel over the bay, just where it makes its greatest bend, one may see the white old torture tower, prison of the town. It looms grimly before you as you gaze at the harbor—which might shelter 4,000 ships, and which is unexcelled in beauty even by Naples—and the heavy bars at the windows of the old place bring one to a realization that here, especially, the poet might have found inspiration for his lines, "Where every prospect pleases and only man is vile.

A little horse car jingles down the quay and the police blow their tin horns at its every turning. One of these police is a giant Moor, and to see him lord it over the passing crowd gives the Occidental an idea of what despotism implies; an idea which he will not soon forget, especially if he comes under His Moorship's displeasure.

Salonik is the second largest city of European Turkey, and its population is given at 105,000. While over half of these are Jews, there are probably 30,000 Turks dwelling there, 3,800 Franks and the majority of what remains about equally divided between the Greeks and Bulgarians. In addition to the Muschir, or Commandant, of Macedonia, a Greek Metropolitan and a Jewish Great Rabbi have their seats here. What between bribes from these, and again from their subjects, the 125 reap a rich harvest, and one that does not fail for want of garnering.

And from Salonik, the City of Spies, and the headquarters of the Terrible 125 Apostles of Bulgaria there shall be more heard when Macedonia comes again into the public's notice. Meanwhile, they plot and plan —and plan and plot.

SOME ESSENTIALS IN GEOGRAPHY

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WHEN I visit an industrial institution where machines, articles of food, clothing or other commodities are being produced, I expect those in charge to be able to tell me the purpose of the various processes employed. They should be able to explain why certain materials are selected and how they are adapted to the uses to which they are to be put. Seldom have I failed to have my expectations in this regard realized. To find a manufacturing company selecting materials and employing processes without a definite knowledge of the results to be attained, would seem strange indeed. Both material and time are too valuable to admit of such a thing. Every effort is made to reduce waste to the minimum, and only essentials, from a business point of view, are employed.

In an educational institution where bodies, minds and souls are being fashioned and given characteristics which are to exert an influence upon the life of the world, we should receive equally definite and intelligent answers to our questions concerning expected results, adaptation of material to the needs of the child, and the value of each particular method employed. Satisfactory answers are the exception rather than the rule, however. Here the materials being shaped are not to be compared in value with stone, iron, the most costly fabrics or precious stones. They are priceless, yet waste is apparent to the most casual observer, and there is little agreement as to essentials or the best method of procedure.

The fundamental purpose of education is certainly to develop character, to fit those being educated for the highest service and joy in life. All other purposes must be subservient to this. If this be true, the essentials of education must be those things and conditions which will contribute most to this end. Having agreed upon this, however, we are not necessarily able to agree in naming the essentials.

Geography is an important factor in education; hence its purpose must agree with that of education in general and its essentials must be selected on the same basis. In so far as the results of geography teaching are meager and unsatisfactory, this condition is, in large part, due to waste; to a failure to select that which is vital and inspiring. Geography is the study of the mutual relations between man and his environment. Only as these relations are grasped through actual contact and observation, can they possess meaning when applied to remote areas.

Wherever the pupil may be, he has before him man in the midst of his environment, showing some of its influence upon his daily life. Here is his material, the study of which will give him a partial mastery of the first great essential in geography—a knowledge of home surroundings, conditions and institutions.

The home, not the earth, is the child's world. From it he directly and indirectly derives the necessities of daily life. This world is actual, real. Here his joys, sorrows, duties, all of his interests and experiences are centered. The outer world is to him as mythical as it was to man thousands of years ago.

That the child's knowledge of unseen lands is based upon things actually observed, is a principle commonly accepted yet not commonly put into practice. Our home geography, is, as a rule, still studied within doors and it therefore lacks concreteness, interest, force. We are apt to forget how largely the home typifies the world. We may not agree with Ritter that all of the conditions necessary for a study of the world are found at home, but it is true that most geographic forms and processes are found in every locality.

Home geography or home knowledge should be centered in the responses which human beings make to their environment. The pupil should know something of the industries of the section in which he lives and how physical conditions and human needs influence them. The pupil should see how this world of his is supplied with food, clothing, and places of shelter and the various comforts and luxuries of daily life. The division of labor, and the dependence of individual upon individual is of great importance in this and in later work. Co-operation in the life of the vicinity should be studied. The construction of roads and streets, the development of a water supply, fire and police protection, park and school systems, and other topics of a similar nature, will, when studied from the vantage ground of personal contact, serve to give the pupil a foundation upon which a real understanding of life in remote regions may be developed.

Location, distance and direction should receive attention also. Places should be located with reference to direction, relation to other places, distance and time involved in reaching them. The making of simple sketch maps is an important part of home geography. By means of such maps these points may be repeatedly emphasized. It is not uncommon to find high school graduates who have no conception of one hundred feet! How useless to talk of the distance which separates New York and San Francisco.

So inseparably linked to the life of the world is the life of the home that no extensive study of the second can be pursued without involving the study of the first. Many of the articles in daily use in the home can be traced to distant lands, and here new and interesting conditions as to surface, climate and people present themselves. Thus the pupil is led by the most natural steps to the study of areas beyond the immediate surroundings—of the outer world—the second great essential in geography.

What should the child be taught regarding the United States and other countries? Many books and courses of study suggest that, by their authors at least, a knowledge of the location of the most conspicuous geographic forms, and the most important cities is the vital thing. Surely no teacher can have failed to observe that to our pupils geography lacks reality. It is static. It is too largely a study of names. Any real picturing of mountains, rivers, forests, cities, and of human beings engaged in daily occupations is the exception. Simple questions calling for answers in terms of actual seeing are responded to by looks of astonishment.

Pupils leaving the elementary school should know why the Hudson is more important than the Delaware; why peaches grow in Michigan but not in Northern Illinois; why coal is cheap in Pennsylvania; why Minneapolis is a great flour-milling city; why population is more sparse in Maine than in Rhode Island; why it costs less to ship a car load of material from Chicago to Denver than from San Francisco to Denver; why New Orleans is not situated at the mouth of the Mississippi. This represents the *character* of the geographic knowledge which pupils should possess. A course leading to the acquisition of such knowledge, will of necessity include facts relating to position, distances, area, population, etc. The course which has given the pupil such knowledge as that indicated above has done more than this—it has given him the power to work out for himself countless problems, to interpret conditions, to enjoy the wonderful works of nature and of man.

Similar results should be worked for in teaching the geography of foreign countries. The time and energy of the pupils should not be employed in memorizing capitals, and in locating capes, but in that which will give them pictures of life as it actually exists, and power to see relations between life and its environment.

The home, the United States, Europe, all countries studied, are but divisions of the larger geographic unit, the globe. Each of these divisions has certain place relations to the earth as a whole, and to other areas. The location of all places studied with reference to hemisphere, latitude, zone, continents, oceans, is brought up repeatedly. Upon the movements of the

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earth depend the daily and seasonal changes to heat and light. Some knowledge of the earth as a globe is, therefore, one of the first essentials in geography. Some definite but very elementary study along these lines should be undertaken in the third grade, but an extended study of mathematical geography has no place in the grades. Before pupils leave the elementary school they should have a clear conception of the meaning of such familiar terms as hemisphere, latitude, longitude, parallel, meridian, equator and many others, and they should be able to use a globe intelligently.

A knowledge of physical geography is essential to the comprehension of general geography, whether of the home or of the world, but serious work in this subject cannot be done below the High School. Its elements, however, can be acquired by pupils in the grades, and a knowledge of these elements is an essential part of a course in geography.

The chief facts connected with the distribution of heat over the earth's surface, and its relation to plant, animal and human life, should be known. The great atmospheric movements and their relation to the distribution of temperature and moisture, and through these to life zones and human activities is important. A general knowledge of storm movements across the country, and the power to interpret the daily weather maps, should be a part of the pupil's equipment. The effect of ocean waters upon climate, and the relation of tides to the use of harbors should be presented. The changes in the appearance of the earth which are going on before the eyes of the pupil, the forces responsible for these changes, and their relation to human affairs, are topics of vital importance. The formation of soil and its relation to moisture and crops should be studied. No pupil should be allowed to leave the elementary school without some knowledge of how vegetation is related to water supply and erosion, and of the tremendous value of the forests upon our mountain slopes.

Some knowledge of commercial and industrial conditions is an essential feature of geography. Given a blank map of the world, an eighth grade pupil should be able to locate the great wheat, corn, cotton, rice, sugar, coffee, timber, cattle, coal and iron-producing regions, and the great industrial and commercial centers. Lead the pupil to realize the importance of climate, soil, surface, hydrography, harbors as commercial bases. The general facts as to the preparation of the raw material for the markets, the means and the routes of transportation, should be studied.

Without the use of maps the teaching of geography is very ineffective, yet there are thousands of school rooms in which there are no maps whatever, and where they are found they are often sparingly used. Were their

importance fully realized by the teacher and school authorities, this condition would not exist.

The ability to use maps and atlases and the habit of using them is one of the most valuable possessions which a course in geography can give pupils. Nothing but constant drill will bring about this desirable result. Pupils should have continual practice in the use of scale and key and in locating the areas and places studied. The purpose of a map is to symbolize realities and thus help the learner to picture the unseen. How often it fails to perform its proper function every teacher knows. This is partly the result of faulty teaching, and every effort should be made to remedy it. Even a *poor* map contributes much that could not be obtained through words alone. Our pupils should be taught how to read contour maps as well as flat, relief and raised maps.

The habit of using a map or globe to locate places, which cannot be visualized should be well fixed. Much of our knowledge of geography, as well as much of our education in general, comes through intelligent reading, but intelligent reading means seeing, realizing that which is read. The places which cannot be pictured as one reads, should be looked up on a map or globe.

Considerable time should be given to map drawing in each grade. Such drawing should be done rapidly and from memory and then corrected by comparing with a wall map. Drawing by this method means effort; the mental picturing of the area to be sketched. Copying is purely mechanical. Accuracy as to details is not to be worked for but rather bold and reasonably correct outlines. The purpose of the work is to strengthen the pupil's mental picture, give him confidence and facility in rapid sketching, and enable the teacher to see his difficulties and successes, and thus render him the greatest possible aid.

Geography has more illustrative material than have other subjects. Unfortunately, however, comparatively little of this material can be brought into the schoolroom. Pictures are invaluable aids in the teaching of this subject. They present conditions which cannot possibly be presented through words or maps. Imagine one teacher striving by means of words alone to give her pupils a conception of Niagara Falls, a snowy New England landscape, life in New York City, or the quaint dress of a Hollander; and another supplementing words by the use of carefully selected pictures. How barren would be the results in the first case, *every* teacher knows through years of experience; how full of interest and meaning in the second, those who have used pictures systematically can testify. Directed study of good pictures stands next to

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actual observation of that which the illustrations represent. Every school should have pictures carefully selected, mounted and classified. It is not enough to hold pictures up before the class or to pass them around. They must be studied in the light of definite questions assigned by the teacher. The illustrations in our modern text-books will yield valuable returns if studied in connection with the printed matter.

One of the prime essentials in geography is that the pupils should actually see as much of what they study as possible. As previously indicated the area which comes under personal observation is usually very limited. It is our duty to make use of this to the fullest extent, however. Pupils may and often do talk about geographic forms for years, and yet not recognize one of these same forms when they see it. Unless the pupil observes streams, falls, valleys, hills, he can have no conception of them, nor of their combination in extensive landscapes. The thought of changes produced in the appearance of the earth through geographic processes, can never be grasped, unless these forces are seen at work. Knowledge of the busy marts of the world, of industries, of commerce, of means of transportation, of social institutions, must always be hazy unless the learner is brought face to face with similar conditions.

It becomes imperative, therefore, to take pupils out of doors occasionally in order to let them know that the things studied have an actual existence, and to give reality to the study of them. Certain advantages are possessed by the teacher in the rural school, and certain others by the teacher in the city. No school is so situated that excursions cannot profitably be made.

If the principle here laid down be sound, then courses of study which do not provide for such work are unsound, and the fact that the geography class cannot go on an excursion without missing a lesson in language or arithmetic, is no excuse whatever. That the advantage resulting from the excursion would be many times as great as the loss, there can be no question. What can the teacher do who has all grades or several? She should be allowed to give the pupils who cannot be taken on the excursion, a half holiday, if necessary. The whole school, including the teacher, will be the better for the trip. Not until excursions become an integral part of every school course in geography will the subject contribute all that it is capable of contributing to the education of the pupil.

It is very frequently said that geography develops the power of observation. It certainly is true that it *may* produce this result, but unless much of the work is observational in character, it is not likely to produce it. We "learn to do by doing." Reading the words found in the book

and answering questions based on this are not likely to quicken the power of observation. Field work and directed study of maps, pictures, and products which can be brought into the schoolroom will do a great deal along this line. Much of the real joy and profit to be derived from a trip into the country, a visit to the city, an extended journey, and from daily life in general, come through the ability to see things.

It is essential that geography be so taught as to strengthen the pupil's reasoning power, to help him to do independent thinking, to be tolerant, to have a lofty conception of life, and some realization of his privileges and obligations. From the first the pupil should be trained to connect cause and consequence so far as he is able, to seek for the *why* as well as for the where and the how. Geography should present inspiring landscapes, mighty forces at work upon the earth and man making use of all to his profit and advancement. When geography brings the pupil into close sympathetic touch with human life in all parts of the earth, it is a subject full of meaning and interest, and becomes a powerful factor in true education, the development of character.

At the end of the course of study a child should be able to read intelligently any common map, should know how to get large facts from that map, should know how to study a text in such a way as to join things together causally, should know how to use an index, how to consult an encyclopedia or other book of reference, and get the facts desired, discarding those irrelevant, how to use maps other than those in the book, and where to turn in the city or town library for the information he desires, and should have a desire to know more. He should not feel that all that is in geography is in the text or that geography is unchanging. He should know the general location of each continent and each country, in reference to other nearby regions; its location on the globe, its chief surface conditions and how these factors affect the distribution of the population; the chief climatic features in the same way, the chief industries and the reasons for their development, the commercial status of each country and its chief commodities and commercial ports and cities. His mind should not be burdened with details that are constantly changing, such as statistics of population or area in exact figures. Round numbers are all that should be called for.

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NOTES.

THE DIVERSE NAMING OF THE WESTERN MOUNTAIN REGION OF AMERICA AS A WHOLE.—The question of the best general title for the western mountains may be considered as trite by those who do not feel the immediate need of its solution in their professional work. The writer by no means believes it to be trite, as he now completely realizes the wide latitude in naming among the recent influential publications dealing with North American geography. It is scarcely to the credit of our geographical societies and alpine clubs that they will publish at length the statement of one traveler that he found mosquitoes in Newfoundland, of another that his hotel accommodation in Manila was bad, and leave undiscussed the suggestive paper of Prof. Russell and his correspondents on the names of the larger geographical features of North America.[1] There would be no advantage to the European geographers if the Alps masqueraded under a dozen different general titles dependent on the personal tastes of individual writers on those mountains.

It is well known that one of the first designations of the entire mountain group lying between the Pacific and the Great Plains was due to Humboldt. His "Cordilleras of the Andes" extended from Cape Horn to the mouth of the Mackenzie river. Humboldt occasionally used the singular form "Cordillera of the Andes" for the same concept. In view of the general restriction of the term "Andes" to the mountains of South America, Whitney, in 1868, proposed that the name "Cordilleras," with variants, "Cordilleran System" and "Cordilleran Region," be retained to designate the North American equivalent of the Andes. This name was adopted in the United States census reports for 1870 and 1880, and by a great number of expert geologists and geographers since 1868. In process of time, however, the singular form, "Cordillera," and variants, became used in the same sense. In one of these forms the Humboldt root word with Whitney's definition has entered many atlases. It appears on numberless pages of high-class Government reports, geographical, geological, and natural history memoirs, and of such works as Baedeker's "Guide-book to the United States," Stanford's "Compendium of Geography," etc.

The time-honored, erroneous, similarly inclusive name "Rocky Mountains," with variants, "Rocky Mountain System," "Rocky Mountain Belt," etc., has, however, held the dominant place in the popular usage. Its inappropriateness for the heavily wooded Canadian mountains is abundantly

[1] Bull. Geog. Society of Philadelphia, 1899, vol. 2, p. 55.

evident. For the United States, Clarence King wrote a generation ago—

"The greatest looseness prevails in regard to the nomenclature of all the general divisions of the western mountains. For the very system itself there is as yet only a partial acceptance of that general name Cordilleras, which Humboldt applied to the whole series of chains that border the Pacific front of the two Americas. In current literature, geology being no exception, there is an unfortunate tendency to apply the name Rocky Mountains to the system at large. So loose and meaningless a name is bad enough when restricted to its legitimate region, the eastern bordering chain of the system, but when spread westward over the Great Basin and the Sierra Nevada, it is simply abominable."[1]

The following table summarizes the above-mentioned variants along with others more recently introduced, and still other general names now only of historical interest. The names of prominent authorities and the leading dates when they have published the respective titles are also entered in the table. The authority for some of the older names is Whitney's work on the United States, published in Boston, 1889.

Mountains of the Bright Stones	General use, end of eighteenth century.
Shining Mountains	Morse, 'Universal Geography,' 1802.
Stoney or Stony Mountains	Arrowsmith, 1795; President Jefferson.
Columbians (*sic*) Mountains	Tardieu, 1820.
Chippewayan Mountains	Hinton, 1834.
The Cordilleras of the Andes (in part)	Humboldt, 1808, etc.
The Cordillera of the Andes (in part)	Humboldt, 1808, etc.
The Cordilleras	Whitney, 1868; many authors since.
The Cordillera	G. M. Dawson, 1884, etc.; Gannett, 1898; Rand-McNally, 1905.
The Western Cordillera of North America	J. D. Dana, 1874, 1880.
The Cordilleras of North America	Hayden, 1883; Leconte, 1892, etc.
The Cordilleran Region	Whitney, 1868, etc.; Hayden, 1883; Shaler, 1891.
The Cordilleran System	Whitney, 1868, etc.; King, 1878; Baedeker, 1893.
The Cordillera System	Hayden, 1883.
The Cordillera Belt	G. M. Dawson, 1879, etc.; Rand-McNally, 1902.
The Pacific Cordillera	Russell, 1899, 1904.
The Cordilleran Plateau	Hayden, 1883.
The Cordillera of the Rocky Mountains	J. D. Dana, 1895.

[1] 'U. S. Geol. Exploration, 40th Parallel, Systematic Geology, 1878,' p. 5.

The Rocky Mountain System	Leconte, 1892, etc.; Heilprin, 1899; many others.
The Rocky Mountain Region	Powell, 1875, etc.; G. M. Dawson, 1890; Gannett, 1899.
The Rocky Mountain Belt	Rand-McNally, 1902.
The Rocky Mountains	Lewis and Clarke; popular.
The Pacific Mountains	Russell, 1899, 1904; Powell, 1899.
The Western Highland	Baedeker, 1893; Keith Johnston Atlas, 1896; Davis, 1899.
The Rocky Mountain Highland	Frye, 1895, 1904.
The Western Plateau	English Imperial Atlas, 1892.

In most technical writings, both of Governmental and of private origin, the suggestion of Whitney has been followed with varying fidelity during the last thirty-five years. It is clear that the inherent connotation of "Cordilleras" is different from that of "Cordillera." The one emphasizes the compound nature of the orographic unit; the other, the singular form of the word, emphasizes the organic union of members. Hayden used both forms of the word. In recent years there has been a rather widespread adoption of the term in the singular number. In 1874, J. D. Dana proposed that the great mountain systems of North America be referred to as the "Western Cordillera" and the "Eastern Cordillera," the latter thus synonymous with what is now commonly called the Appalachian system. Russell, in 1899, proposed "Pacific Cordillera" and "Atlantic Cordillera" with respectively the same significance. Usage has, however, declared that there is but one Cordillera in North America. The expression "Pacific Cordillera" is, according to such established usage, redundant. "The Cordillera of North America," "The Cordilleran System," "The Cordilleran Region," or, with the proper context, simply "The Cordillera," seem to be to-day the best variants on the Humboldt root word.

The fine, dignified quality of the word, convenient in adjective form as in noun form, its unequivocal meaning and its really widespread use in atlas and monograph, make "Cordillera" incomparably the best term for technical and even for the more serious popular works. In fact, there seems to be no good reason why the name should not be entered in elementary school atlases. The objection that the word is likely to be mispronounced by teacher or scholar would equally exclude "Himalaya" and "Appalachian" from school-books. In teaching or learning what is meant by "The Cordillera," the teacher or scholar would incidentally learn so much Spanish. If, in the future, this should be deemed an intolerable nuisance, speakers in English could, in their licensed way, throw the accent back to the second syllable and avoid the unscholarly danger. The second

objection that a cordillera is hereby made to include the extensive plateaus of Utah and Arizona or the great intermontane basins of the United States is more serious. It will, however, hardly displace the word from its present technical use as designating a single Earth-feature ruggedly mountainous as a whole, but bearing subordinate local details of form and structure not truly mountainous. If this objection be regarded as invalid by advanced scientific workers, it will have still less weight for popular or educational use.

The ordinary connotation of the term "highland" makes it unsuitable as part of the name indicating the world's vastest mountain group. Like Powell's name "Stony Mountains," suggested for the majestic Front ranges north of the Union Pacific Railroad, "highland" is "belittling." To most readers it would inevitably suggest Scotland's relief. If the word be raised to the dignity proposed in "Western Highland" or "Rocky Mountain Highland," the writer on the natural features of the Cordillera runs the risk of ambiguity in employing the indispensable common noun "highland," while dealing with local problems of geology, geography, or natural history.

For popular use, the best title alternative with "Cordillera" is, in the writer's opinion, "The Pacific Mountain System." It is suggested by Russell's "The Pacific Mountains." The addition of the word "system" seems advisable as stating the unity of the whole group. The proposal of J. D. Dana to restrict the common noun "system" to mean merely the group of ranges formed in a single geosyncline has to face overwhelming objections. The usage of generations is against it; the enormous difficulty of actually applying it in nature is, perhaps, yet more surely fatal to the idea.

The restriction of the titles "Pacific Ranges" (Hayden), "Pacific Mountains" (Powell in his earlier use of that term; he has since applied it to the whole Cordillera), and "Pacific Mountain System" (A. C. Spencer and A. H. Brooks) to the relatively narrow mountain belt lying between the ocean and the so-called "Interior Plateau" of the Cordillera, seems particularly unfortunate. If there is one grand generalization possible about the entire Cordillera, it is that the Cordillera is both genetically and geographically, a Pacific feature of the globe. The Rocky Mountain ranges proper, the Selkirks, and the Bitter Roots bear the marks of interaction of Pacific basin and continental plateau as plainly as do the Sierra Nevada, the Coast ranges, or the St. Elias range. The large view of the Cordillera assuredly claims the word "Pacific" for its own, and cannot allow in logic that "Pacific Mountain System" shall mean anything less

than the entire group of mountains. The artificial nature of the narrower definition would be equally manifest if it were applied to a topographic or genetic unit forming a relatively small part of the Andes along the immediate shore-line of South America. The Andes mountains form the Pacific mountain system of South America as the whole North American Cordillera forms the true Pacific mountain system of North America.

Yet the term "system" is itself so elastic that it is fitly applied to subdivisions of the Cordillera. For example, the "Rocky Mountain System" expresses an unusually convenient grouping of the northern ranges in Alaska, and of the eastern ranges of the Cordillera in Canada and the United States. Popular, as well as scientific, usage has once for all recognized the propriety of there being in name, as well as in fact, system within system in the grouping of mountains.

R. A. DALY.

THE TEACHING OF GEOGRAPHY.—Various causes have been at work to produce the renewed interest in the teaching of geography thus manifested. In the first place, it has been clearly realized that the older methods of teaching the subject, which I am sorry to say in some cases still prevail, crammed the memory of the child with a host of more or less uninteresting facts, and did nothing either to feed or to cultivate the imagination, or to train the reason of the pupil. This is true whether the method relied on be mere book knowledge, or whether the teaching be supplemented by the use of the ordinary maps. The latter method was and is certainly an improvement on the former, but yet mere map understanding is not sufficient for the complete comprehension of geographical facts and their inter-relations with one another. Much less is it so if we endeavor, as we ought, to make our pupils realize that the geographical facts of a district condition, and to some extent are conditioned, by the more important natural and social phenomena whose exact study belongs to other but related sciences. For it is only by keeping this latter point of view ever in mind that our geographical teaching can be made real and living to the child. Again, it is being slowly realized that any kind of geographical teaching which trains the reason of the pupil to the perception of the causal inter-relation between physical fact and physical fact is the best medium by which to introduce the youthful mind to the study of the natural sciences, and hence it has been well said that geography teaching may be made the gateway to the teaching of science for the subject of geography, of all school subjects, if rightly taught, may enable a child to realize that the world in which he lives is not a mere sum of facts, but an inter-related system, a cosmos, in which fact is related to fact, and conditions

and is conditioned by the nature of the whole. In this connection I may for a moment allude to an opinion held strongly by many educationalists of the present day. They contend that the exact sciences, such as physics and chemistry, should be preceded by a course of study having for its object the training of the pupil to perceive the larger and more obvious causal inter-relations existing between the various parts of the Universe; and they further maintain that if we begin to endeavor to lead a young pupil to select out and to endeavor to understand the more minute and less obvious causal inter-relations, before he has undergone a training in the discrimination of the first-named set of relations, then our method is educationally erroneous, and is one not likely to produce the best results in training the pupil in the methods of science and in the formation of the so-called scientific habit of mind. For in the study of physical geography and the allied branches of knowledge, the facts to be observed and the inter-relations to be discerned are easily separated out from the whole of which they form a part, and can be made readily obvious to minds incapable, through immaturity, of understanding the more abstract and intricate system of causes with which sciences such as chemistry and physics deal. However that may be, all are agreed that the study of geography in the widest acceptance of the term is one of the best instruments for extending the horizon of the pupil, for the cultivating of his imagination, and for training him to reason and to realize the Universe as a system. But a knowledge of geography is not merely valuable as a preliminary to the more thorough and the more accurate study of the natural sciences, it is in many cases necessary for the right understanding of historical facts, and for the thorough comprehension of the history of our own and of other countries. A moment's reflection will enable any one to realize that geographical conditions have largely determined historical change in the past, and that the historical conditions existing at the present can be made completely intelligible only through the prior understanding of the geographical relations. Again, and above all, a full knowledge of geographical facts is necessary for the right understanding of the economic and commercial conditions of our own and other countries. For the localization of a people and the distribution of their industries within any one country and throughout the world generally can be made thoroughly intelligible only when our geography teaching has clearly realized this as its ultimate aim, and when the knowledge has been imparted to the pupil according to a sound method. As the final result of our teaching of geography, we should have made our pupils realize not merely that a certain city or town is placed here or there, but why this is so; not merely that it has such and such industries, but why

these industries are located here and not elsewhere; and lastly, they must understand the use and function the particular city plays in the economic and social life of the nation and of the world generally. Only in so far as we have done this can we be said to have taught the subject at all. Further, while the economic and commercial aspect of the subject is so important for a country such as ours, from the narrow utilitarian point of view, that the knowledge and training is necessary for all those who intend in after-life to enter upon a commercial career, yet it is also important from the fact that it is only by a method which endeavors to attain the end of showing the value of geography for the understanding and interpretation of the economic and social life of a people that we can really educate the child and train his reason. Now the aim of this exhibition is to make us all realize that the teaching of geography is necessary for the true interpretation of natural and social phenomena; that without the preliminary training which geography teaching gives, our efforts at imparting natural science will be more or less ineffective; that without a correct knowledge of the facts of geography, our historical interpretation of the past and our understanding of the historical associations of our own times can never be complete; and that the economic and social life of a people is unintelligible except through a knowledge of the physical environment which everywhere and in all times conditions the growth and distribution of a people and the localization of their industries. Lastly, and above all, the aim of the organizers is to endeavor to bring home to us the unity and inter-connection of all knowledge, to make us realize that geography teaching is not concerned with a particular set of facts and a particular system of causes, but that many systems of facts and their inter-relations must be understood if we are to understand the nature of the social whole.

The second, and perhaps the more important, object of the exhibition is to enable us to obtain some insight into a true and sound method of imparting geographical knowledge, and to give us some insight into methods of arousing, maintaining, and sustaining the interest of our pupils in this particular subject, so that as our final aim we may enable them in after-life to comprehend intelligently the social and economic world in which as men and women they will have to take their place and perform their appropriate functions. Now the best method of imparting geographical knowledge is to go direct to Nature and learn from direct observation the causal interaction of physical fact to physical fact, and how the natural and physical features of a country or district determine the social and economic life of the people. This was the method of Rousseau; still more so was it the method of that much greater educationalist, Pestalozzi, in the teaching of

geography. The cardinal principle of the educational method of Pestalozzi was that the symbol should never be given to the child until he had comprehended the thing signified by the symbol, and we are told that once when his own child used a term without a knowledge of the thing signified by it, he wept from sorrow at finding such an example of educational depravity in his own offspring. In his teaching of geography, Pestalozzi carried out thoroughly the maxim of presenting the symbol only after the thing itself was comprehended. In the once famous school at Burgdorf the children, along with their teacher, explored the country in the neighborhood of the school, collecting clay in baskets from the river-banks, and on their return modeled out day by day what they had learned of the physical nature of their environment, and of the inter-connection of physical feature to physical feature. Only after this had been thoroughly comprehended from the clay model was a flat map introduced and the relation of model to map explained. In our present-day teaching of geography this method of going direct to Nature should be employed wherever possible, and especially in the earlier stages, and any other method must be judged good or bad according as it approximates or falls short of the direct method.

But under the altered conditions of our time, and especially in our large towns, the method of going direct to Nature can be followed only to a limited extent, and, further, the method has limitations in itself which makes its consistent use inapplicable under existing conditions, for it is obvious that the direct method is always limited by the narrow range of the child's environment. Again, the best method of teaching here, as in so many other subjects, cannot be employed in its entirety even if it were possible, on account of the limited time in which the knowledge must be imparted. Hence the direct method must be supplemented by others, and all these subsidiary methods must have for their aim the endeavor to make geography a real, a concrete, and a living subject of instruction. If the geography teaching of our schools has only for its results the memorizing of lists of names extracted from a book or gleaned from the unintelligent and premature use of a map, then whatever we may be doing we are not educating the child. Nay, more, by such methods we not only kill the child's present interest in the subject, but also fail to foster any future or later interest; and in many cases such teaching tends to make the child grow up dull, stupid, and unimaginative, and with reason dormant about the world in which he lives.

It would ill become me, however, at this time and in this place to inflict upon you a lecture on the method of teaching geography, but before

closing there are one or two principles to which I have alluded already, and which this exhibition is meant to illustrate, that I should like to draw attention to. In the first place, the exhibition furnishes many instances of the practical application of the principle that, wherever possible, whether in the teaching of physical geography, of political or commercial geography, or the interconnection of these facts with the social and economic facts, we must base our teaching upon what is already known to the child and within his comprehension. Then upon this as a basis we must proceed to form a concrete and living idea of the district or region as a whole. But we must also remember that the mere picturing of a district or of a country is not sufficient; the child at a later stage must be trained to employ his reason in the perception of the causal inter-relations at work. Now, one particular section of the exhibition has for its aim to show how by means of models and diagrams such a concrete picture may be formed in the mind of the child, and how we may train his reason in the perception of the causal inter-relations at work. Another principle, of which the exhibition gives concrete illustration, is that the symbol should follow and not precede the thing signified, and that in particular the understanding and comprehension of a map should be based and follow upon the prior understanding of the reality of which the map is merely a diagrammatic illustration.

But if we limited our teaching of geography to the mere understanding of the child's own district and of his own country; if our only aim were to make him realize how many factors have to be taken into account in the thorough interpretation of any one region, then we should not attain the highest result, and we should fail to realize all that we should endeavor to do in our geography teaching. In addition to this, we must further endeavor to lead our pupils to a knowledge and understanding—imperfect it may be—of the world as a whole, and of the relation, position, and place of his own country to the whole. Now this is a second aim of the present exhibition. It endeavors to show how by the use of models of pictures, of lantern-slides, and other concrete means we may widen the intellectual horizon of the child; how we may extend his range of vision and cultivate his imagination; and how we may deepen and broaden his sympathies.

It is not sufficient that we should know how to lead our pupil to understand and interpret his immediate physical environment, nor to make him best realize the place and function of his own country on this terrestrial globe; we must further endeavor to make him comprehend the nature of the Universe as a whole, and how this planet on which he lives is related to the solar system of which it forms a part, and to the other systems which the starry heavens reveal to our gaze.—*Scottish Geographical Magazine.*